

WHAT IS CLAIMED IS:

1. A method of estimating a transmit channel through which a first wireless communication transceiver is to transmit to a second wireless communication transceiver, comprising:

5 providing information indicative of a relationship between said transmit channel and a receive channel through which the first wireless communication transceiver receives communications from the second wireless communication transceiver; and

combining said relationship information with further information to produce an estimate of said transmit channel.

10 2. The method of Claim 1, wherein said further information includes an estimate of said receive channel.

15 3. The method of Claim 1, wherein said providing step includes combining a further estimate of said transmit channel with an estimate of said receive channel to produce said relationship information.

4. The method of Claim 3, wherein said last-mentioned combining step includes representing said further transmit channel estimate and said receive channel estimate as first

and second quantities, respectively, and determining a ratio of said first quantity to said second quantity, said relationship information including said ratio.

5 5. The method of Claim 4, wherein said further information includes a further estimate of said receive channel represented as a third quantity, said first-mentioned combining step including multiplying said ratio by said third quantity.

10 6. The method of Claim 1, including dynamically updating said further information at a plurality of points in time, repeating said combining step for each said update of said further information, and maintaining said relationship information static during each said repetition of said combining step.

 7. The method of Claim 6, wherein said further information includes an estimate of said receive channel.

15 8. The method of Claim 6, wherein said providing step includes combining a further estimate of said transmit channel with an estimate of said receive channel to produce said relationship information.

9. The method of Claim 1, wherein said providing step includes the first wireless communication transceiver transmitting a first communication to the second wireless communication transceiver, and the second wireless communication transceiver transmitting a second communication to the first wireless communication transceiver in response to its receipt of the first communication.

10. The method of Claim 9, wherein said providing step includes using the second communication to estimate said receive channel and using the first communication to estimate a further receive channel through which the first communication was received at the second wireless communication transceiver.

11. The method of Claim 10, wherein said providing step includes combining said estimate of said receive channel with said estimate of said further receive channel to produce said relationship information.

12. The method of Claim 9, wherein said second wireless communication transceiver transmitting step includes the second wireless communication transceiver transmitting said second communication immediately in response to its receipt of the first communication.

13. A wireless communication apparatus, comprising:

an antenna;

a transmitter coupled to said antenna;

a receiver coupled to said antenna; and

5 a transmit channel estimator coupled to said transmitter and said receiver for
estimating a transmit channel through which said transmitter is to transmit to a further
wireless communication apparatus, said transmit channel estimator including an input for
receiving information indicative of a relationship between said transmit channel and a
receive channel through which said receiver receives communications from the further
10 wireless communication apparatus, and said transmit channel estimator including a combiner
coupled to said input for combining said relationship information with further information to
produce an estimate of said transmit channel.

14. The apparatus of Claim 13, provided as a MIMO apparatus.

15 The apparatus of Claim 13, wherein said further information includes an
estimate of said receive channel.

16. An apparatus for estimating a transmit channel through which a first wireless communication transceiver is to transmit to a second wireless communication transceiver, comprising:

an input for receiving information indicative of a relationship between said transmit
5 channel and a receive channel through which the first wireless communication transceiver receives communications from the second wireless communication transceiver; and

a combiner coupled to said input for combining said relationship information with further information to produce an estimate of said transmit channel.

10 17. The apparatus of Claim 16, wherein said further information includes an estimate of said receive channel.

18. The apparatus of Claim 16, including a further combiner having an input for receiving a further estimate of said transmit channel and for receiving an estimate of said
15 receive channel, said further combiner for combining said further estimate of said transmit channel with said estimate of said receive channel to produce said relationship information.

19. The apparatus of Claim 18, wherein said further combiner uses first and second quantities to represent said further transmit channel estimate and said receive channel

estimate, respectively, and wherein said further combiner is for determining a ratio of said first quantity to said second quantity, said relationship information including said ratio.

20. The apparatus of Claim 19, wherein said further information includes a further estimate of said receive channel represented as a third quantity, said first-mentioned combiner for multiplying said ratio by said third quantity.